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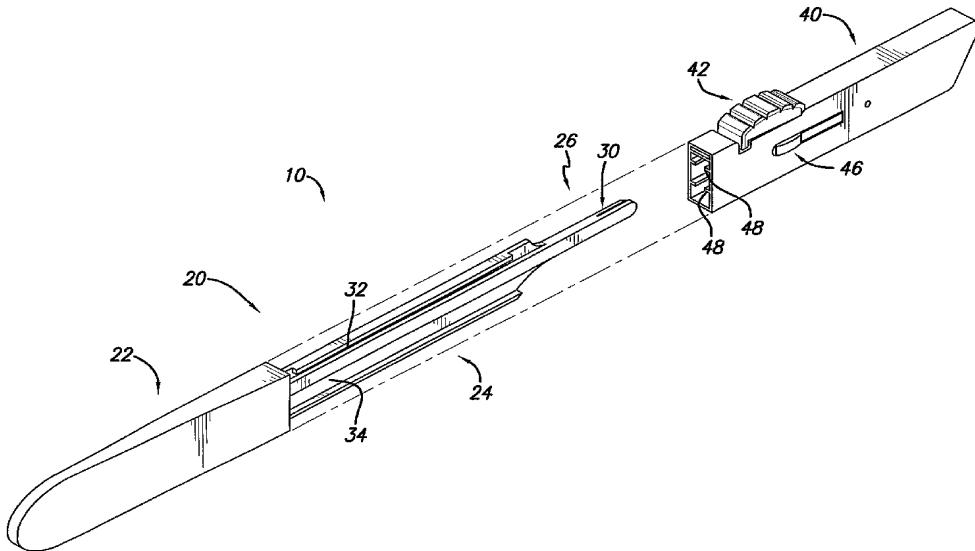
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(57) Abstract: A safety scalpel (10) includes a blade (12) having an orifice (14) disposed between a sharp end and a blunt end, and a handle (20) with a front portion (24) adapted to receive the blunt end of the blade (12) and securely engage the blade (12) via the orifice (14). The safety scalpel (10) also includes a substantially hollow housing (40) configured to retain internally the blade (12) and slide back and forth onto the front handle portion (24) between a first position in which the sharp end of the blade (12) is fully exposed for operational use and a second position in which the sharp end of the blade (12) is fully enclosed for safety storage before activation. The safety scalpel (10) further includes an actuator (46) configured to disengage the internally retained blade (12) from the front handle portion (24) when the blade housing (40) is in the second position.

## **SAFETY SCALPEL**

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### **TECHNICAL FIELD**

This invention relates generally to surgical use applications, and more particularly to a safety scalpel.

### **BACKGROUND ART**

Surgical scalpels may have a sturdy handle and a blade portion removably mounted on the handle for use during a given procedure. After the blade has been used, the blade may be removed and discarded, after which the handle may be sterilized and made ready for further use by mounting a new blade. New blades may be packaged in individual sterile packages formed by two sheets of paper or aluminum foil sealing the blade between them, much like finger bandages are packed.

When the blade is to be mounted on the handle, one paper or aluminum foil layer is folded back to expose the rearward or mounting portion of the blade. The package is then grasped so as to press the sides of the blade between the thumb and forefinger while the handle is inserted into the opening of the blade. While the blade should be held so that the cutting edge points away from the user, the potential for injury still exists.

Slipping of the blade within the paper or aluminum foil, in conjunction with the force required to properly install the blade on the handle, may push the blade through the cover and cause injury. Nothing prevents the blade from moving relative to its envelope and nothing prevents the blade from puncturing the cover. Therefore, individuals are subject to injury while installing the blade on the handle.

Upon completion of the surgical procedure, the blade may be either manually detached from the handle and placed in a sharps bin, or the handle with the blade may be inserted into a container, which may break off the blade.

It can be seen that attachment of the blade to the handle may be a hazardous procedure and can easily result in a sharps injury. If the blade is manually detached, a sharps injury can also result, which may be even more hazardous as the blade may be contaminated.

During surgical use, the scalpels can accidentally cut the surgeon's fingers, or the fingers of nurses and other support personnel. Furthermore, operating personnel may be accidentally cut when the scalpel is passed between personnel. Blades may need to be quickly removed from the handle during surgery. This may increase the likelihood of injury to either the surgeon or others.

Surgeons may have a personal preference as to a particular scalpel handle. The surgeon may prefer a certain weight and feel of a handle for achieving desired results in surgery. Furthermore, some safety systems allow for only a certain handle and certain blade systems to be utilized together.

What is needed is a safety scalpel system that would allow for specifically weighted, reusable handles to be used with safety and/or normal scalpel blades.

## DISCLOSURE OF INVENTION

Presented herein are various embodiments of a safety scalpel. According to one embodiment a safety scalpel system includes a handle capable of coupling to a blade with or without a safety housing.

In another embodiment, a safety scalpel system includes a blade, a handle configured to couple to the blade, and a housing configured to couple to, and to enclose the blade, and to couple to the handle, and allow the blade to selectively couple to the handle and to selectively decouple from the housing, wherein the handle is configured to couple to the blade with or without the housing.

In yet another embodiment, a cartridge system includes retaining members configured to contain a blade within the housing, an actuatable tab, wherein the blade couples to the handle and the housing moves between a safe position and an exposed position wherein the blade is exposed for use, a blade actuator with the actuator configured to decouple the blade contained within the housing from the handle.

## BRIEF DESCRIPTION OF DRAWINGS

Figure 1 is a perspective view of a safety scalpel system, according to an exemplary embodiment.

Figure 2 is a perspective view of a safety scalpel system, showing the blade housing, according to an exemplary embodiment.

Figure 3 is an elevational view of a safety scalpel system, showing the blade housing and a handle, according to an exemplary embodiment.

Figure 4 is an elevational view of a safety scalpel system, showing the blade housing in a safe position, according to an exemplary embodiment.

Figure 4A is a cross-section view of the blade housing along line 4A-4A from Figure 4, according to an exemplary embodiment.

Figure 5 is an elevational view of a safety scalpel system, showing the blade housing in an exposed position with respect to a handle, according to an exemplary embodiment.

Figure 6 is an elevational view of a safety scalpel system, showing the blade housing engaging a handle, according to an exemplary embodiment.

Figure 7 is an elevational view of a safety scalpel system, showing the blade housing engaging a handle, according to an exemplary embodiment.

Figure 7 is an elevational view of a safety scalpel system, showing the blade housing engaging a handle, according to an exemplary embodiment.

Figure 8 is an elevational view of a safety scalpel system, showing the blade housing disengaging a handle, according to an exemplary embodiment.

Figure 9 is an elevational view of a safety scalpel system, showing the blade housing apart from a handle, according to an exemplary embodiment.

Figure 10 is a perspective view of a handle and blade, according to an exemplary embodiment.

Figure 11 is a perspective view of a handle and blade, according to an exemplary embodiment.

Figure 12 is a top cross-sectional view of a blade housing and handle along line 12-12 from Figure 8, according to an exemplary embodiment.

Figure 13 is a top cross-sectional view of a blade housing disengaging a handle, according to an exemplary embodiment.

### **MODE(S) FOR CARRYING OUT THE INVENTION**

The detailed description set forth below in connection with the appended drawings is intended as a description of exemplary embodiments and is not intended to represent the only forms in which the embodiments may be constructed and/or utilized. The description sets forth the functions and the sequence of steps for constructing and operating the illustrated embodiments. However, it is to be understood that the same or equivalent functions and sequences may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of this disclosure.

A safety scalpel system according to an exemplary embodiment is shown in Figure 1, generally at **10**. System **10** may include a handle **20** and a housing **40**. The housing **40** is configured to house a blade and to couple to handle **20** such that the blade may couple to the handle and housing **40** may slide up handle **20** to expose the blade for use.

Handle **20** may include a grasping structure **22**, which may be configured to be utilized by a user to hold the system when in use. Handle **20** may also include a housing receiving portion **24**, which may be adjacent to, and coupled to, grasping structure **22**. Furthermore, handle **20** may include a blade receiving portion **26** which may be adjacent to housing receiving portion **24**. Blade receiving portion **26** may be configured to couple to a blade with or without housing **40**. In this manner, the handle may be utilized with a bare scalpel blade, or it may be utilized with a blade within housing **40**.

Handle **20** may be tapered, as shown or may have different configurations, including a uniform thickness, as desired by the preferences of the user. Furthermore, it may have other configurations to make it more comfortable to use and may be configured differently for each individual user.

Housing **40** may be configured to slide onto handle **20** in a safe position as the blade **12** may couple to blade receiving portion **26** while the housing **40** encloses the blade **12**, as shown in Figure 4. Blade receiving portion **26** may have a groove **30** that may be configured to fit into an orifice of a blade **12**, and secure to the blade **12** such that a user may utilize the handle **20** and blade **12** as a scalpel. Housing receiving portion **24** may include a top channel **32** and a bottom channel **34** that may be configured to couple to, and receive portions of housing **40**. This configuration may make the system more stable, as well as provide structure for coupling the housing **40** to the handle **20**.

Housing **40** may include an actuatable tab **42** and a blade actuator **46**. Tab **42** may engagedly couple to a guide member **44** to allow housing **40** to move from a safe position, as shown in Figure 4, to an exposed position as shown in Figure 5. The exposed position may be where housing **40** is adjacent housing receiving portion **24** and a blade is coupled to blade receiving portion **26** and exposed for use.

Tab 42 may be located on the top of housing 40, but may be located in other locations about housing 40 depending on the configuration, as desired. It will be appreciated that other means for allowing housing 40 to move may be utilized, as desired.

Housing 40 may also include stabilizing members 48 which may be configured to couple to top channel 32 and bottom channel 34 to ensure a proper coupling of housing 40 to handle 20, and to stabilize the entire system for use.

Figure 2 shows a system 10, according to an exemplary embodiment, with housing 40 shown exploded. Housing 40 may include inner surfaces and outer surfaces. Housing 40 may further include one or more retaining members 50 that are configured to couple to and retain a blade 12 within housing. As shown, there are three retaining members, generally on the inner surfaces of housing 40. As shown there may be two retaining members 50, which may be configured to contact the non-cutting end of the blade 12, and one retaining member, which may be configured to enter the orifice 14 of blade 12. It will be appreciated that other shapes and configurations may be utilized for retaining members 50, as desired.

In this view, the interior portion of blade actuator 46 is shown in further detail. With this configuration, a blade 12 may be coupled to housing 40 by retaining members 50 and may be configured to slide onto blade receiving portion 26 and groove 30 to couple to handle 20. When it is desired that the blade be removed, blade actuator 46 may be actuated to bias blade 12 away from handle 20, and to recouple to retaining members 50 and housing 40.

Blade receiving portion 26 of handle 20 may further include a stop 28, which may be configured to contact the end of blade 12, such that blade 12 will securely fasten to handle when it is coupled to handle 20. This configuration may make the system more stable for use.

Figure 3 shows an elevational view of a system 10, again which may include handle 20, housing 40, and blade 12 (hidden). Blade 12 is retained in housing 40, and coupled to retaining members 50. As shown by the directional arrow, housing 40 may be moved toward handle 20, which again includes a blade receiving portion 26. In various embodiments, housing 40 may also include a tab 42 and a guide member 44 which may be coupled to and/or integral with tab 42.

Figure 4 shows housing 40 in the safe position, in which blade 12 is substantially, or completely enclosed by housing 40. Housing 40 may slide onto, or couple to, handle 20 and may remain in the safe position until tab 42 is actuated, and housing 40 is moved toward grasping structure 22 of handle 20. When housing 40 is in the safe position, it may completely enclose blade 12, except for an opening in the front of housing 40, to allow blade 12 to extend outwardly when housing 40 is in an exposed position. When tab 42 is actuated, guide member 44 may be actuated downwardly and couple to top channel 32, such that it will slide within top channel 32, and allow housing 40 to move further toward grasping structure 22, as shown by the directional arrow.

As guide member 44 is moved along channel 32, the blade receiving portion 26 may engage orifice 14 of blade 12. Also, when housing 40 is moved toward grasping structure 22, blade 12 may couple to blade receiving portion 26 and remain fixed with respect to handle 20.

Figure 4A shows a cross sectional view along line 4A-4A of Figure 4. As shown, stabilizing members 48 may be configured to slide in, to couple to, top channel 32 and bottom channel 34 to allow housing 40 to slide onto handle 20.

Figure 5 shows housing 40 in the exposed position where blade 12 is exposed for use by the user, and housing 40 is not covering blade 12 to allow the user to use blade 12. In the exposed blade position, blade actuator 46 (Fig. 2) is configured to engage a slot 47 provided on housing receiving portion 24 of handle 20 (Figs. 2 – 4, 6, 8 – 11). Slot 47 allows blade actuator 46 to return to a “rest” (non-tensioned) state when housing (cartridge) 40 is slid back to expose blade 12 (Fig. 5). Slot 47 also keeps the profile of blade actuator 46 generally lower than when it is in a tensioned state. As shown by the directional arrows, when housing 40 is to be moved from the exposed position to the safe position, tab 42 may be again actuated which may allow guide member 44 to reenter top channel 32 to allow housing 40 to move with respect to handle 20.

Figure 6 again shows housing 40 in the safe position, enclosing blade 12. It will be appreciated that as shown by the directional arrows, tab 42 may be actuated again to permit guide member 44 to enter top channel 32 and to allow housing 40 to be returned to the exposed position to allow re-use of the blade and housing, as shown in Figure 7.

Figure 7 again shows the housing 40 in the exposed position, and again the directional arrows show the downward actuation of tab 42 which allows guide member 44 to enter top channel such that the housing 40 may be moved again to the safe position, as shown in Figure 8.

Figure 8 shows the housing 40 in the safe position. In this position, blade 12 may remain coupled to handle 20 via blade receiving portion 26 and groove 30 (not shown). Blade actuator 46 may then be actuated to disengage blade 12 from handle 20 and back to retaining members 50 (not shown), when housing 40 is moved in the direction of the directional arrow. Blade actuator 46 may contact blade 12 and bias blade 12 away from handle 12 and toward housing 40. In this manner blade 12 may selectively decouple and/or re-couple to and from housing 40 and handle 20 such that it may be removed safely and a new or different blade and/or housing and blade system may be utilized, as desired.

Figure 9 again shows the housing 40 and the handle 20 separated after use such that the housing and blade may be safely removed and properly disposed of.

Figure 10 shows a handle 20 and a blade 12 according to an exemplary embodiment. Blade 12 may include an orifice 14, as shown. Furthermore, handle 20 again may include a blade receiving portion 26 which may include a groove 30. Groove 30 may be configured to couple to blade 12 and orifice 14 such that the blade will slide onto groove 30 and encounter stop 28 as shown in Figure 11. In this manner, bare blades may couple to handle 20 via this configuration. Furthermore, this may be generally the manner in which blade 12 couples to handle 20 when substantially being enclosed in housing 40 (not shown) when used within the system. Furthermore, handle 20 may be configured to receive bare blades and/or blades within safety housing 40. Yet further, handle 20 may be configured with weighting characteristics particular to each individual user, such that many may be made, and the user may be more comfortable with the weight and “feel” of handle 20.

Blade 12 may also be integral with handle 20, and housing 40 may move from a safe to an exposed condition. With this configuration the entire system may be disposable. Furthermore, blade 12 may also be made of plastic, and may be formed at, or near the same time as handle 20.

Handle 20 may be made from polymers, plastics, metals, rubber, and combinations thereof as desired. Blade 12 may be a typical scalpel blade such that it may be used alone with handle 20 and/or with the safety housing

system **40**. Blade **12** is typically a common scalpel blade. Many different types and styles of blades may be utilized with the handle **20** and the system **10**. Housing **40** may be made in two parts as shown in Figure 2, however other configurations may be utilized as desired, including made as a single injection molded piece. Housing may be made from plastics, polymers, rubber, metal, and combinations thereof, as desired.

Figure 12 shows a cross-sectional view of system **10** along lines **12-12** from Figure 8. As shown, when blade actuator **46** is actuated downwardly as depicted by the directional arrow labeled **A**, it may contact blade **12** and disengage blade **12** from blade receiving portion **26** of handle **20** as housing **40** is moved in the direction of the directional arrow labeled **B**. Furthermore, when housing **40** is moved in the direction of the directional arrow **B**, away from handle **20**, blade **12** will stay generally stationary with respect to housing **40** and may contact, and be coupled to, retaining members **50**. In this manner, blade **12** may decouple from blade receiving portion **26** of handle **20** and selectively recouple to housing **40**.

As shown in Figure 13, handle **20** is removed from housing **40** while blade **12** stays generally stationary with respect to housing **40** and recouples to housing **40** via retaining members **50**. Furthermore, blade actuator **46** returns to a steady state position as shown in Figure 13. With this configuration, blades may easily selectively decouple from handle **20** and recouple to housing **40** such that the blade will not be exposed, which may increase the safety of users. Furthermore, housing and blade may then be disposed of, and/or put into a container to be counted later.

Housing **40** may selectively attach, detach, and reattach to handle **20**, as desired. This configuration would allow a user to reuse a blade and housing, as needed.

It will be appreciated that many of the housing **40** and blade systems may be utilized and/or reutilized during one operation as the blades **12** become dull and/or if different blades are needed for different tasks. Furthermore, handles **20** may be utilized with or without a housing **40** and with a blade **12** separately such that in emergency situations a typical scalpel blade may be utilized without the housing **40** and blade system. Furthermore, handles **20** may be weighted, configured and/or designed to the particular preferences of the surgeon such that surgeons may be more likely to utilize them. Additionally, many handles **20** may be made to the specifications of a user, such that they may be thrown away and/or reused, as desired. With this configuration, handles may be more likely to be used by surgeons as they may conform to the surgeons' particular wants and needs as far as stiffness, weight, and other characteristics of a handle, among others.

In closing, it is to be understood that the exemplary embodiments described herein are illustrative of the principles of exemplary embodiments. Other modifications that may be employed are within the scope of this disclosure. Thus, by way of example, but not of limitation, alternative configurations may be utilized in accordance with the teachings herein. Accordingly, the drawings and description are illustrative and not meant to be a limitation thereof.

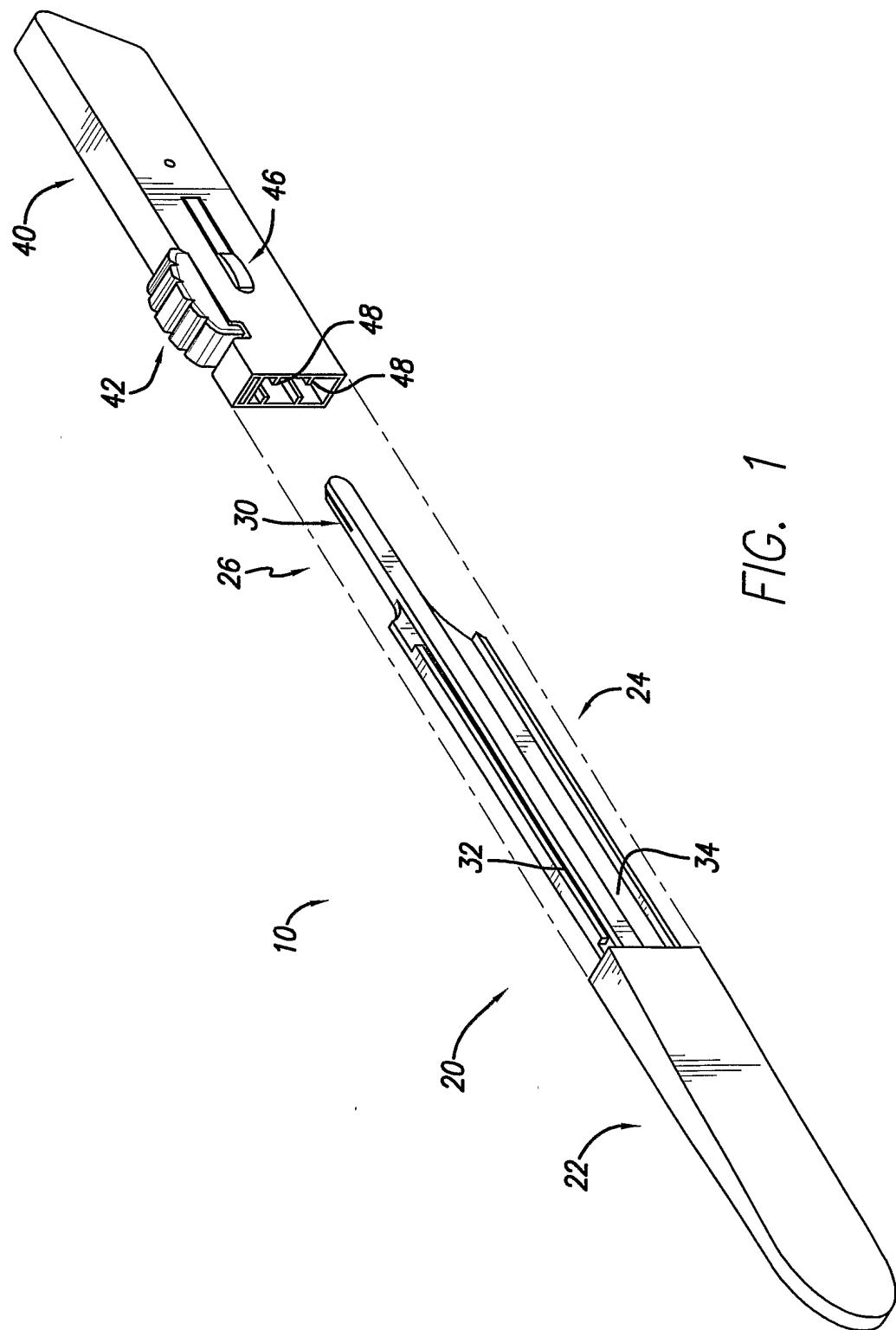
## CLAIMS

### **WHAT IS CLAIMED IS:**

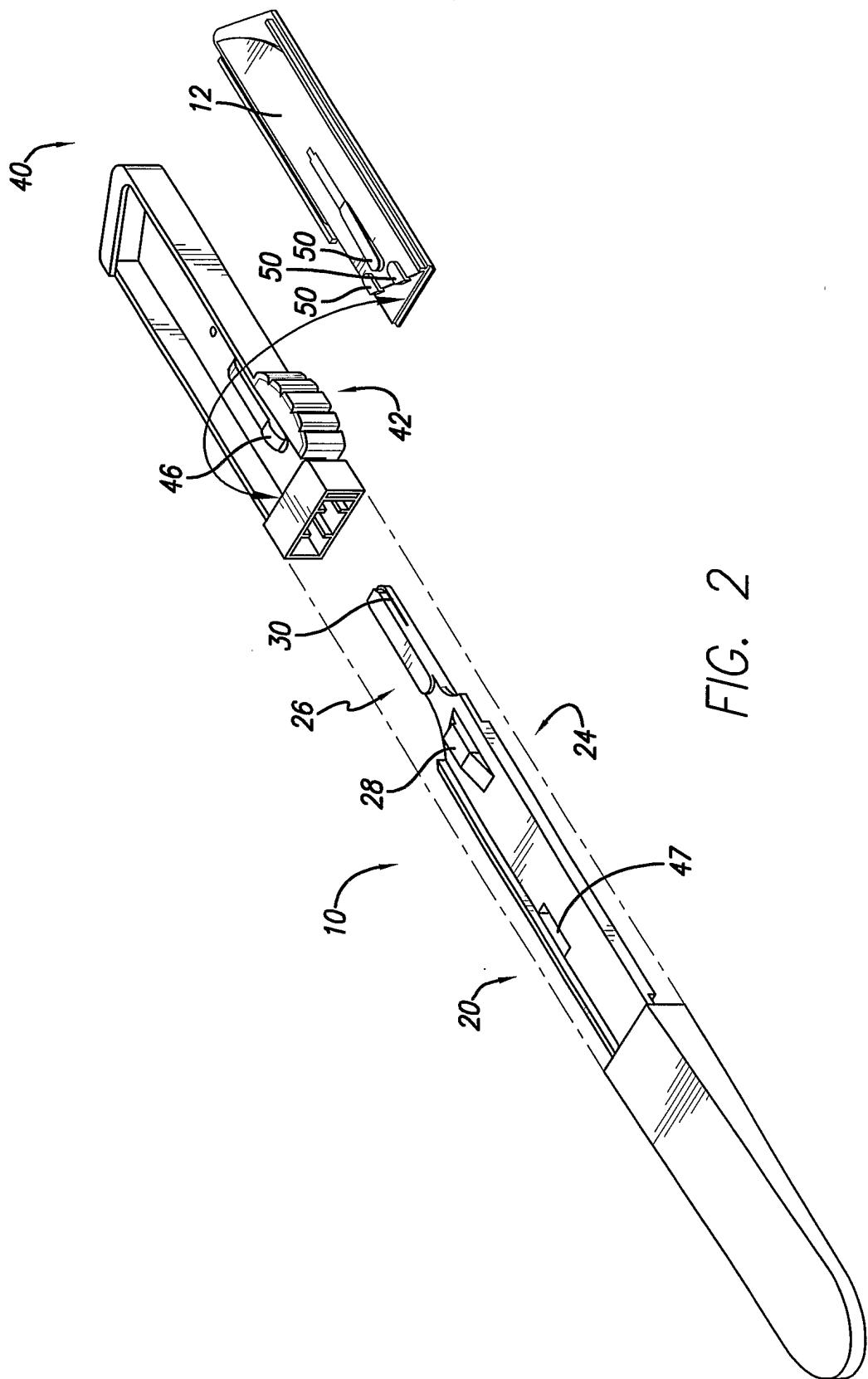
1. A safety scalpel, comprising:
  - a blade having an orifice disposed between a sharp end and a blunt end;
  - a handle with a front portion adapted to receive said blunt end of said blade and securely engage said blade via said orifice;
  - a substantially hollow housing configured to retain internally said blade and slide back and forth onto said front handle portion between a first position in which said sharp end of said blade is fully exposed for operational use and a second position in which said sharp end of said blade is fully enclosed for safety storage before activation, said internally retained blade being securely engaged by said front handle portion via said orifice in said first and second positions,
  - a sliding position actuator integrally formed on said blade housing; and
  - an actuator configured to disengage said internally retained blade from said front handle portion when said blade housing is in said second position, said disengaging actuator being integrally formed on said blade housing.
2. The safety scalpel of Claim 1, wherein said disengaging actuator is integrally formed on said blade housing proximate to said sliding position actuator.
3. The safety scalpel of Claim 1, wherein said handle has a rear grasping portion.
4. The safety scalpel of Claim 1, wherein said front handle portion is equipped with a groove adapted to receive said blunt end of said blade.
5. The safety scalpel of Claim 4, wherein said front handle portion is further equipped with means for securely engaging said blade via said orifice.
6. The safety scalpel of Claim 5, wherein said front handle portion is also equipped with at least one guide channel.
7. The safety scalpel of Claim 6, wherein said blade housing is adapted internally to slide within said at least one guide channel when actuated.
8. The safety scalpel of Claim 4, wherein said front handle portion includes a blade stop in spaced relation to said groove, said blade stop configured to limit the advance of said blunt end of said blade when said blade is being engaged by said front handle portion.

9. The safety scalpel of Claim 7, wherein said sliding position actuator includes a guide member which slides within said at least one guide channel when pushed toward said front handle portion by a user.
10. The safety scalpel of Claim 5, wherein said disengaging actuator is adapted to contact and disengage said internally retained blade from said blade securing means on said front handle portion when pushed toward said front handle portion by a user in said second position.
11. The safety scalpel of Claim 10, wherein said disengaged blade is retained by said blade housing.
12. The safety scalpel of Claim 11, wherein said blade housing with said internally retained and disengaged blade is decoupled from said handle by sliding said blade housing away from said groove on said front handle portion.
13. The safety scalpel of Claim 11, wherein said blade is retained by said blade housing via a plurality of integral blade retaining members.
14. The safety scalpel of Claim 13, wherein said plurality of integral blade retaining members includes at least two members adapted to frictionally retain said blunt end of said blade within said housing.
15. The safety scalpel of Claim 14, wherein said plurality of integral blade retaining members further includes at least one member adapted to frictionally engage said orifice of said blade within said housing.
16. The safety scalpel of Claim 3, wherein said handle is configured with weighting characteristics particular to an individual user.
17. The safety scalpel of Claim 1, wherein said disengaging actuator is configured to engage a slot provided on said front handle portion when said sharp end of said blade is fully exposed in said first position, said slot engagement defining a non-tensioned state for said disengaging actuator.

1/5



2/5



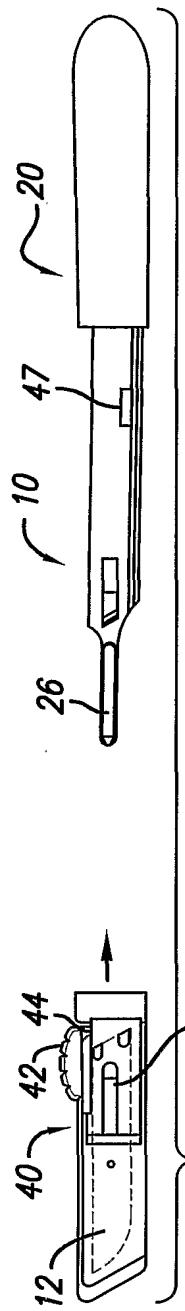


FIG. 4

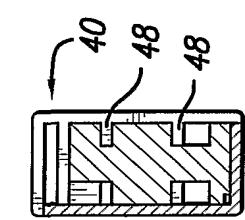


FIG. 4A

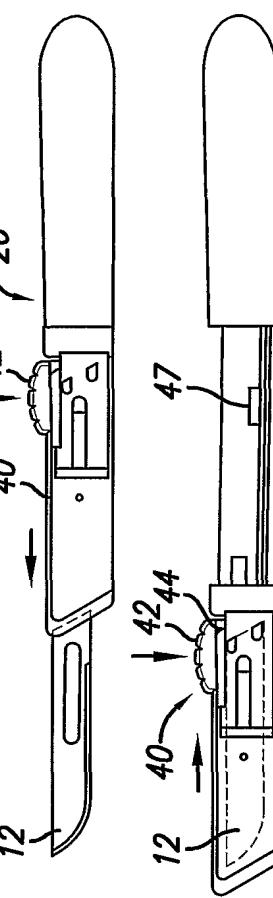


FIG. 5

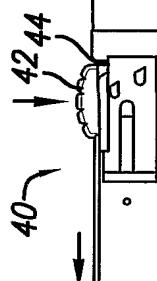


FIG. 6

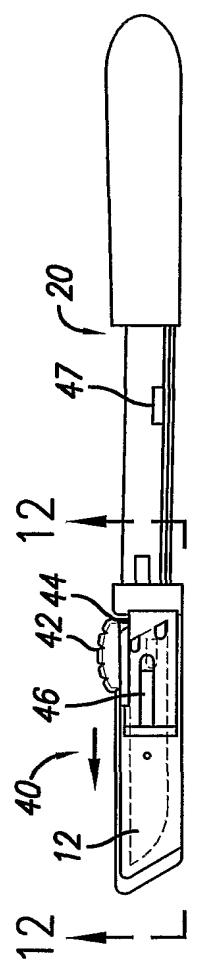


FIG. 7

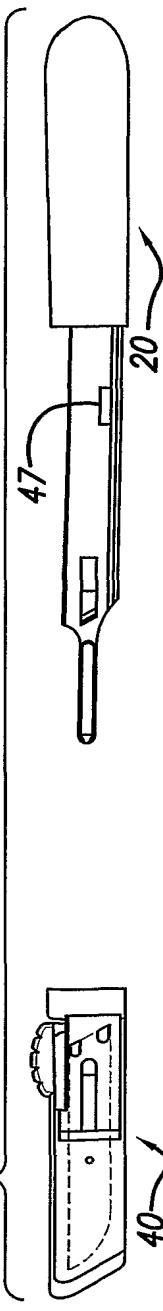
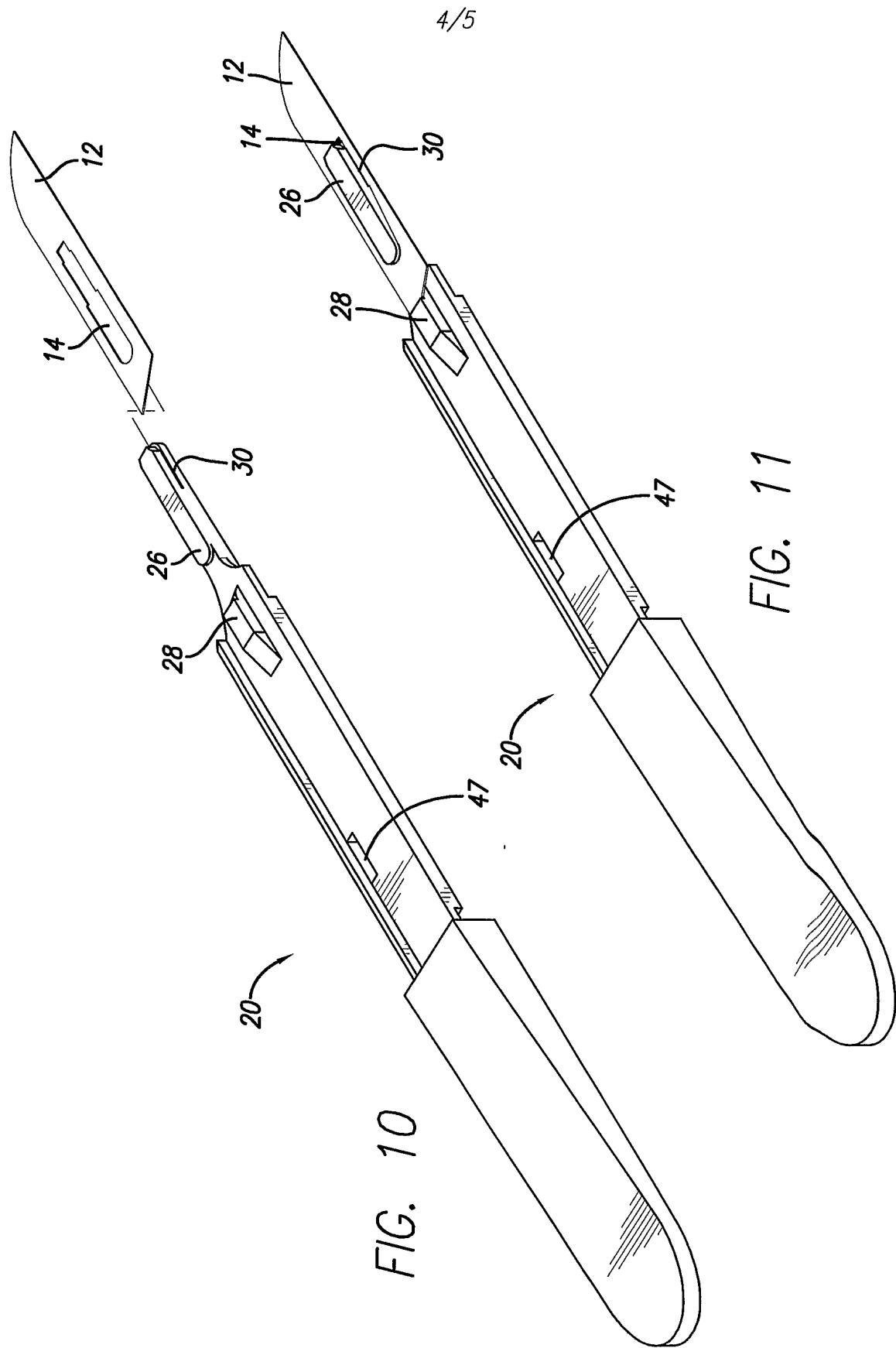


FIG. 8

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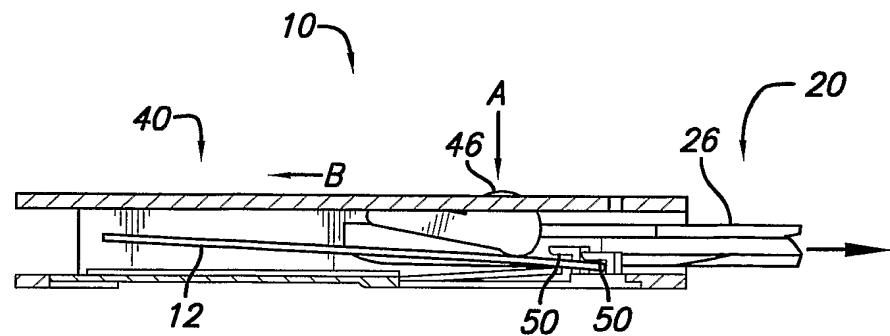


FIG. 12

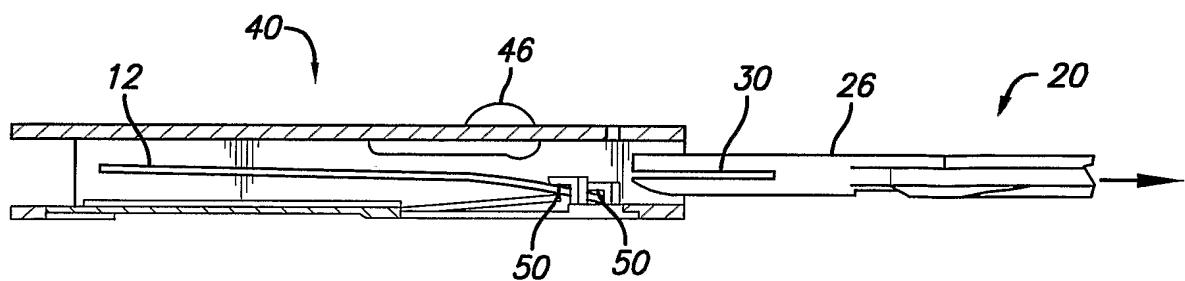


FIG. 13